

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2004/014699

International filing date (day/month/year)
29.09.2004

Priority date (day/month/year)
29.09.2003

International Patent Classification (IPC) or both national classification and IPC
G02F1/167, G02B26/02, C09D5/44

Applicant
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1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/014699

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/014699

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	5,7
	No: Claims	1,2,3,4,6,8,9,10
Inventive step (IS)	Yes: Claims	
	No: Claims	1-10
Industrial applicability (IA)	Yes: Claims	1-10
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V.

1 CITED DOCUMENTS

The following documents are referred to in this communication:

D1 : US 5 914 806 A (GORDON II JOSEPH GROVER ET AL) 22 June 1999
(1999-06-22)

D2: CHENG T-L ET AL: "Spherulites of cis-1,4-polybutadiene: molecular weight effects" POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 36, no. 1, 1995, pages 73-80, XP004026014 ISSN: 0032-3861

2 INDEPENDENT CLAIM 1

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claim 1** is not new in the sense of Article 33(2) PCT.

Document **D1** discloses (the references in parenthesis applying to this document):

an electrophoretic dispersion liquid (*col.1, l.50-60*)
for an electrophoretic display apparatus (*figures 1, 2*), comprising:
a plurality of electrophoretic particles (*col.1, l.50-69; col.2, l.13 - col.3, l.11*),
each surface of which is modified by one of a basic group and an acidic group (*the pigment particles listed in col.2, l.13 - col.3, l.11 which are formed by a basic or respectively an acidic organic material have a surface which is modified by a basic group or respectively an acidic group*);
a liquid for holding said electrophoretic particles to be dispersed therein (*col.1, l.50-53; col.4, l.32-40*);
and a polydiene (*col.3, l.46 - col.4, l.31; in particular col. 3, l.49 and col.3, l.51*),
having the other group (*col.3, l.12-15*),
dissolved in said liquid (*col.4, l.39-57 and col.5, l.45 - col.6, l.49*).

3 DEPENDENT CLAIMS 2-10

Dependent **claims 2-10** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

- 3.1 Document D1 further includes all the additional technical features of current **claims 2, 3, 4, 6, 9 and 10**:

Claims 2, 3, 4, 6: see col. 3, l. 46-55.

Claim 9: see col. 4, l.32-57

Claim 10: see col. 5, l.8-37; figures 1, 2

The subject-matter of **claims 2, 3, 4, 6, 9 and 10** is thus also not new in the sense of Article 33(2) PCT.

- 3.2 Document **D1** teaches that preferred examples of said polymeric stabilizers also include polydienes, in particular a polybutadiene (*col.3, l.51*), dissolved in a non-polar solvent (*col.4, l.32-38*). The solubility of said polybutadiene in said non-polar solvent at a temperature range of 0 to -20 °C is not explicitly mentioned or discussed in **D1**.

However, it is known that polybutadiene has a glass transition temperature of about -100 °C, exhibits a melting point slightly below 0 °C and is solvable in a non-polar solvent like e.g. toluene (*see document D2, p.74, sections "Materials", "General thermal behaviour" and tables 1, 2*). Consequently, polybutadiene is obviously solvable in a non-polar solvent like e.g. in toluene at temperatures slightly below 0 °C.

Since polydienes like polybutadiene dissolved in non-polar solvents are used as polymeric stabilizers in the dispersion liquid disclosed in **D1** (*see col.3, l.51 and col.4, l.39-57*), the technical feature whereby said polydiene is also solvable in said non-polar solvent at temperatures slightly below 0 °C, which is within the range claimed in **claim 8**, is considered to be implicitly disclosed in **D1**.

The subject-matter of **claims 8** is thus also not new in the sense of Article 33(2) PCT.

- 3.3 Although the molecular weight of the polydienes used as polymeric stabilizers in the dispersion liquids disclosed in **D1** is not defined or specified therein, the range of 1000 to 100000 (g/mol) claimed in **claim 5** can not form the basis of an inventive step in the sense of Article 33(3) PCT.

It is generally known that the molecular weight of polymers and in particular polydienes can be controlled e.g. by varying an amount of an externally added chain transfer agent (*see e.g. D2, p.74, section "Materials"*) such that values within the claimed range can be achieved (*see e.g. D2, p.74, table 1*) where it is desirable.

- 3.4 In the examples given in **D1** (*see col. 5, l.45 - col.6, l.49*) the dispersion liquid contains said polymeric stabilizer in an amount which is 2.5 times (*see example 1*) respectively 1 times (*see example 2*) a weight of the electrophoretic pigment particles.

Thus, the values of these examples are within the range defined in current **claim 7** ("*0.01 to 3 times*"). The examples given in **D1** differ from the subject-matter of **claim 7** only in that a polystyrene (*see example 1*) respectively a polysiloxane (*see example 2*) is used as a polymeric stabilizer whereas **claim 7** claims a polydiene as a polymeric stabilizer. However, document **D1** teaches that preferred examples of said polymeric stabilizers also include polydienes, in particular a polyisoprene or a polybutadiene, besides said polystyrene or a polysiloxane (*see col. 3, l.46-55*). Thus, the person skilled in the art would obviously use polydiene in an amount relative to the weight of said electrophoretic pigment particles as defined in **claim 7**.

The subject-matter of **claim 7** can therefore not form the basis of an inventive step in the sense of Article 33(3) PCT.